

CLAIMS

1. A programmable logic device (PLD), comprising:
a plurality of logic elements (LE's) arranged in an array;
a signal routing architecture including a plurality of signal routing lines to route signals among the LE's; and
a plurality of signal drivers along each of the signal routing lines,
wherein

for each of the signal routing lines,

that signal routing line has an integer N associated with the
signal routing line;

the drivers along that signal routing line are regularly spaced
along that signal routing line at an interval of N LE 's for that line;

for each of a first set of at least some of the signal routing lines,

that signal routing line is substantially interrupted by an interface
region such that a partial signal routing line is formed for that signal routing line
between the interface region and a driver along the signal routing line from the
interface region less than N LE's from the interface region; and

the PLD further comprises an input driver configured to drive
from the interface region along the partial signal routing line formed for that signal
routing line.

2. The PLD of claim 1, wherein:

for each of the first set of at least some of the signal routing lines, the input
driver configured to drive from the interface region along the partial signal routing lines
for that signal routing line is characterized by a size that corresponds to a distance from
the interface driver to the driver on the signal routing line closest to the interface region
along the signal routing line.

3. The PLD of claim 1, wherein:

for a second set of signal routing lines, each signal routing line in the second set
having the same N associated therewith and having a partial signal routing line formed
from the interface region along that signal routing line,

the drivers along each signal routing line of the set are staggered with respect to the drivers along an adjacent signal routing line of the set.

4. The PLD of claim 3, wherein:

the interface region includes signal lines provided from outside the LE array;
and

the signal lines provided from outside the LE array are coupled to at least some of the second set of signal routing lines.

5. The PLD of claim 3, wherein:

the interface region includes signal lines provided from IP core logic inserted into the LE array; and

the signal lines provided from the IP core logic are coupled to at least some of the second set of signal routing lines via signal selection circuitry.

6. A programmable logic device (PLD), comprising:

a plurality of logic elements (LE's) arranged in an array;

a signal routing architecture including a plurality of signal routing lines to route signals among the LE's; and

a plurality of signal drivers along each of the signal routing lines,
wherein,

for each of the signal routing lines,

that signal routing line has an integer N associated with the
signal routing line; and

the drivers along that signal routing line are regularly spaced
along that signal routing line at an interval of N LE 's for that line; and

for each of a first set of at least some of the signal routing lines,

that signal routing line is substantially interrupted by an interface
region such that a partial signal routing line is formed for that signal routing line
between the interface region and a driver along the signal routing line from the
interface region less than N LE's from the interface region.

7. The PLD of claim 6, wherein:

for a second set of signal routing lines, each signal routing line in the second set having the same N associated therewith and having a partial signal routing line formed from the interface region along that signal routing line,

the drivers along each signal routing line of the set are staggered with respect to the drivers along an adjacent signal routing line of the set.

8. The PLD of claim 7, wherein:

the interface region includes signal lines coupled to outside the LE array; and

the signal lines coupled to outside the LE array are coupled to at least some of the second set of signal routing lines.

9. The PLD of claim 7, wherein:

the interface region includes signal lines coupled to IP core logic inserted into the LE array; and

the signal lines coupled to the IP core logic are coupled to at least some of the second set of signal routing lines via signal selection circuitry.

10. A programmable logic device (PLD), comprising:

a plurality of logic elements (LE's) arranged in an array;

a signal routing architecture including a plurality of signal routing lines; and

a plurality of signal drivers along each of the signal routing lines,

wherein,

for each of a set of the signal routing lines,

that signal routing line has an integer N associated with the signal routing line;

the drivers along that signal routing line are regularly spaced along that signal routing line at an interval of N LE 's for that line; and

the drivers along each signal routing line of the set are staggered with respect to the drivers along an adjacent signal routing line of the set.

11. The PLD of claim 10, wherein the signal routing lines of the set of signal routing lines are substantially interrupted by an interface region such that a

partial signal routing line is formed for each of at least some of the signal routing lines, between the interface region and a driver along that signal routing line from the interface region less than N LE's from the interface region.

12. A method of configuring a design of a programmable logic device (PLD), comprising:

- a) configuring the design such that the PLD includes a plurality of logic elements (LE's) arranged in an array;
- b) configuring the design such that the PLD includes a signal routing architecture including a plurality of signal routing lines to route signals among the LE's; and
- c) configuring the design such that the PLD includes a plurality of signal drivers along each of the signal routing lines,

including,
for each of the signal routing lines,
associating an integer N with the signal routing line; and
configuring the design such that the drivers of the PLD along that signal routing line are regularly spaced along that signal routing line at an interval of N LE's for that line; and

for each of a first set of at least some of the signal routing lines,
configuring the design such that the signal routing line of the PLD is substantially interrupted by an interface region such that a partial signal routing line is formed for that signal routing line between the interface region and a driver along the signal routing line from the interface region less than N LE's from the interface region; and

configuring the design such that the PLD further comprises an input driver configured to drive from the interface region along the partial signal routing line formed for that signal routing line.

13. The method of claim 12, wherein:

the method includes configuring the design such that, for each of the first set of at least some of the signal routing lines, the input driver configured to drive from the interface region along the partial signal routing lines for that signal routing line is

characterized by a size that corresponds to a distance from the interface driver to the driver on the signal routing line closest to the interface region along the signal routing line.

14. The method of claim 12, wherein:

the method includes configuring the design such that, for a second set of signal routing lines, each signal routing line in the second set having the same N associated therewith and having a partial signal routing line formed from the interface region along that signal routing line, and

the method includes configuring the design such that the drivers along each signal routing line of the set are staggered with respect to the drivers along an adjacent signal routing line of the set.

15. The method of claim 14, wherein:

the method includes configuring the design such that the interface region includes signal lines provided from outside the LE array; and

the method includes configuring the design such that the signal lines provided from outside the LE array are coupled to at least some of the second set of signal routing lines.

16. The method of claim 14, wherein:

the method includes configuring the design such that the interface region includes signal lines provided from IP core logic inserted into the LE array; and

the method includes configuring the design such that the signal lines provided from the IP core logic are coupled to at least some of the second set of signal routing lines via signal selection circuitry.

17. A method of configuring a design of a programmable logic device (PLD), comprising:

configuring the design such that the PLD includes a plurality of logic elements (LE's) arranged in an array;

configuring the design such that the PLD includes a signal routing architecture including a plurality of signal routing lines to route signals among the LE's; and

a plurality of signal drivers along each of the signal routing lines,
wherein,

for each of the signal routing lines,

that signal routing line has an integer N associated with the
signal routing line; and

the method includes configuring the design such that the drivers
along that signal routing line are regularly spaced along that signal routing line at an
interval of N LE 's for that line;

for each of a first set of at least some of the signal routing lines,

the method includes configuring the design such that that signal
routing line is substantially interrupted by an interface region such that a partial signal
routing line is formed for that signal routing line between the interface region and a
driver along the signal routing line from the interface region less than N LE's from the
interface region.

18. The method of claim 17, wherein:

the method includes configuring the design such that, for a second set of signal
routing lines, each signal routing line in the second set having the same N associated
therewith and having a partial signal routing line formed from the interface region
along that signal routing line,

the drivers along each signal routing line of the set are staggered with
respect to the drivers along an adjacent signal routing line of the set.

19. The method of claim 18, wherein:

the method includes configuring the design such that the interface region
includes signal lines coupled to outside the LE array; and

the method includes configuring the design such that the signal lines coupled to
outside the LE array are coupled to at least some of the second set of signal routing
lines.

20. The method of claim 18, wherein:

the method includes configuring the design such that the interface region
includes signal lines coupled to IP core logic inserted into the LE array; and

the method includes configuring the design such that the signal lines coupled to the IP core are coupled to at least some of the second set of signal routing lines via signal selection circuitry.

21. A method of configuring the design of a programmable logic device (PLD), comprising:

configuring the design such that the PLD includes a plurality of logic elements (LE's) arranged in an array;

configuring the design such that the PLD includes a signal routing architecture including a plurality of signal routing lines; and

configuring the design such that a plurality of signal drivers along each of the signal routing lines,

wherein,

the method includes configuring the design such that, for each of a set of the signal routing lines,

that signal routing line has an integer N associated with the signal routing line;

the drivers along that signal routing line are regularly spaced along that signal routing line at an interval of N LE's for that line; and

the drivers along each signal routing line of the set are staggered with respect to the drivers along an adjacent signal routing line of the set.

22. The method of claim 21, wherein the method includes configuring the design such that the signal routing lines of the set of signal routing lines are substantially interrupted by an interface region such that a partial signal routing line is formed for each of at least some of the signal routing lines, between the interface region and a driver along that signal routing line from the interface region less than N LE's from the interface region.